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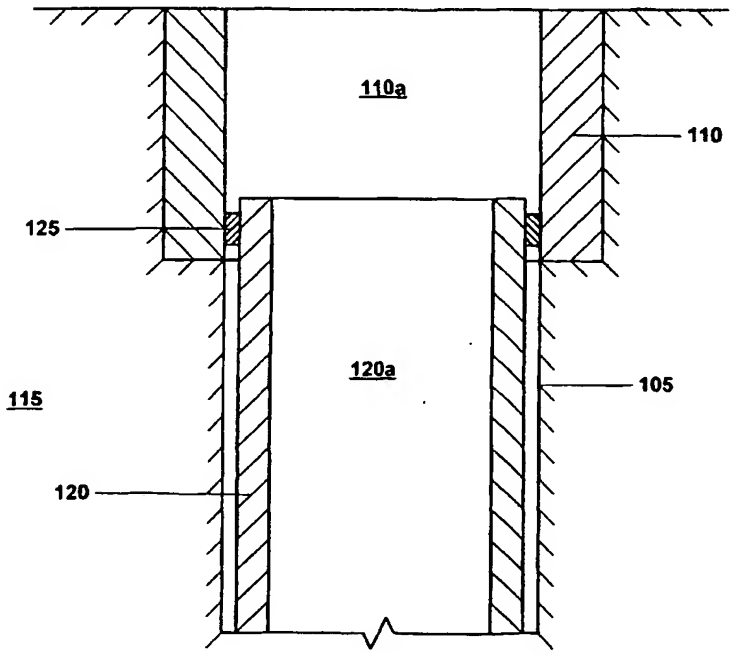
(54) Title: SEAL RECEPTACLE USING EXPANDABLE LINER HANGER



(57) Abstract: The end of an expandable liner hanger provides a receptacle for another tubular liner.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

SEAL RECEPTACLE USING EXPANDABLE LINER HANGER

Cross Reference To Related Applications

[0001] The present application claims the benefit of the filing dates of: (1) U.S. provisional patent application serial no. 60/343,674, attorney docket no. 25791.68, filed on 12/27/2001, the disclosure of which is incorporated herein by reference.

[0002] The present application is related to the following: (1) U.S. patent application serial no. 09/454,139, attorney docket no. 25791.03.02, filed on 12/3/1999, (2) U.S. patent application serial no. 09/510,913, attorney docket no. 25791.7.02, filed on 2/23/2000, (3) U.S. patent application serial no. 09/502,350, attorney docket no. 25791.8.02, filed on 2/10/2000, (4) U.S. patent application serial no. 09/440,338, attorney docket no. 25791.9.02, filed on 11/15/1999, (5) U.S. patent application serial no. 09/523,460, attorney docket no. 25791.11.02, filed on 3/10/2000, (6) U.S. patent application serial no. 09/512,895, attorney docket no. 25791.12.02, filed on 2/24/2000, (7) U.S. patent application serial no. 09/511,941, attorney docket no. 25791.16.02, filed on 2/24/2000, (8) U.S. patent application serial no. 09/588,946, attorney docket no. 25791.17.02, filed on 6/7/2000, (9) U.S. patent application serial no. 09/559,122, attorney docket no. 25791.23.02, filed on 4/26/2000, (10) PCT patent application serial no. PCT/US00/18635, attorney docket no. 25791.25.02, filed on 7/9/2000, (11) U.S. provisional patent application serial no. 60/162,671, attorney docket no. 25791.27, filed on 11/1/1999, (12) U.S. provisional patent application serial no. 60/154,047, attorney docket no. 25791.29, filed on 9/16/1999, (13) U.S. provisional patent application serial no. 60/159,082, attorney docket no. 25791.34, filed on 10/12/1999, (14) U.S. provisional patent application serial no. 60/159,039, attorney docket no. 25791.36, filed on 10/12/1999, (15) U.S. provisional patent application serial no. 60/159,033, attorney docket no. 25791.37, filed on 10/12/1999, (16) U.S. provisional patent application serial no. 60/212,359, attorney docket no. 25791.38, filed on 6/19/2000, (17) U.S. provisional patent application serial no. 60/165,228, attorney docket no. 25791.39, filed on 11/12/1999, (18) U.S. provisional patent application serial no. 60/221,443, attorney docket no. 25791.45, filed on 7/28/2000, (19) U.S. provisional patent application serial no. 60/221,645, attorney docket no. 25791.46, filed on 7/28/2000, (20) U.S. provisional patent application serial no. 60/233,638, attorney docket no. 25791.47, filed on 9/18/2000, (21) U.S. provisional patent application serial no. 60/237,334, attorney docket no. 25791.48, filed on 10/2/2000, (22) U.S. provisional patent application serial no. 60/270,007, attorney docket no. 25791.50, filed on 2/20/2001, (23) U.S. provisional patent application serial no. 60/262,434, attorney docket no. 25791.51, filed on 1/17/2001, (24) U.S, provisional patent application serial no. 60/259,486, attorney docket no. 25791.52, filed on 1/3/2001, (25) U.S. provisional patent application serial no. 60/303,740, attorney docket no. 25791.61, filed on 7/6/2001, (26) U.S. provisional patent application serial no. 60/313,453, attorney docket no. 25791.59, filed on 8/20/2001, (27) U.S. provisional patent application serial no. 60/317,985, attorney docket no. 25791.67, filed on 9/6/2001, (28) U.S. provisional patent application serial no. 60/3318,386, attorney docket no. 25791.67.02, filed on 9/10/2001, (29) U.S. utility patent application serial no.

09/969,922, attorney docket no. 25791.69, filed on 10/3/2001, and (30) U.S. utility patent application serial no. 10/016,467, attorney docket no. 25791.70, filed on December 10, 2001, the disclosures of which are incorporated herein by reference.

Background of the Invention

[0003] This invention relates generally to oil and gas exploration, and in particular to isolating certain subterranean zones to facilitate oil and gas exploration.

[0004] During oil exploration, a wellbore typically traverses a number of zones within a subterranean formation. Some of these subterranean zones will produce oil and gas, while others will not. Further, it is often necessary to isolate subterranean zones from one another in order to facilitate the exploration for and production of oil and gas. Existing methods for isolating subterranean production zones in order to facilitate the exploration for and production of oil and gas are complex and expensive.

[0005] The present invention is directed to overcoming one or more of the limitations of the existing processes for isolating subterranean zones during oil and gas exploration.

Summary of the Invention

[0006] According to one aspect of the present invention, an apparatus is provided that includes a subterranean formation defining a wellbore, a tubular wellbore casing positioned within and coupled to the wellbore, a first tubular liner positioned within the wellbore overlapping with and coupled to the wellbore casing, a second tubular liner positioned within the wellbore and overlapping with and coupled to the first tubular liner. The second tubular liner is coupled to the first tubular liner by: machining an end of the first tubular liner, and inserting an end of the second tubular liner into the machined end of the first tubular liner.

[0006] According to another aspect of the present invention, a method for extracting fluidic materials from a subterranean formation including a wellbore that traverses the formation and a wellbore casing positioned within and coupled to the wellbore is provided that includes coupling an end of a tubular liner to an end of the wellbore casing, machining an end of the tubular liner, inserting an end of another tubular liner into the machined end of the tubular liner, and sealing the interface between the other tubular liner and the wellbore casing.

[0008] According to another aspect of the present invention, a system for extracting fluidic materials from a subterranean formation including a wellbore that traverses the formation and a wellbore casing positioned within and coupled to the wellbore is provided that includes means for coupling an end of a tubular liner to an end of the wellbore casing, means for machining an end of the tubular liner, means for inserting an end of another tubular liner into the machined end of the tubular liner, and means for sealing the interface between the other tubular liner and the wellbore casing.

[0009] According to another aspect of the present invention, in an apparatus comprising a subterranean formation defining a wellbore that includes a wellbore casing positioned within and coupled to the wellbore and a tubular liner coupled to an end of the wellbore casing, a method of conveying fluidic

materials to and from the tubular liner is provided that includes machining the end of the tubular liner, inserting and supporting an end of another tubular liner in the machined end of the tubular liner, and conveying fluidic materials to and from the tubular liner using the other tubular liner.

Brief Description of the Drawings

[0010] FIG. 1 is a fragmentary cross-sectional view illustrating a liner coupled to a preexisting wellbore casing.

[0011] Fig. 2 is a fragmentary cross sectional illustration of the liner of Fig. 1 after machining the end of the liner.

[0012] Fig. 2a is a fragmentary cross sectional illustration of the machined end of the liner of Fig. 2.

[0013] Fig. 3 is a fragmentary cross sectional illustration of the insertion of a seal assembly into the machined end of the liner of Fig. 2.

[0014] Fig. 4 is a fragmentary cross sectional of the seal assembly of Fig. 3.

[0015] Fig. 4a is a fragmentary cross sectional illustration of one of the seals of the seal assembly of Fig. 4.

[0016] Fig. 4b is a fragmentary cross sectional illustration of another one of the seals of the seal assembly of Fig. 4.

[0017] Fig. 4c is a fragmentary cross sectional illustration of another one of the seals of the seal assembly of Fig. 4.

Detailed Description of the Illustrative Embodiments

[0018] Referring to Fig. 1, a wellbore 105 including a casing 110 that defines a passage 110a is positioned in a subterranean formation 115. During exploration of the subterranean formation 115, the wellbore 105 may be extended in a well known manner. A tubular liner 120 that defines a passage 120a including an elastomeric seal 125 may then be positioned in the extended portion of the wellbore 105 and coupled to the end of the casing 110 by radially expanding and plastically deforming the upper end of the tubular liner 120 into engagement with the lower end of the casing. In this manner, the elastomeric seal 125 is compressed into engagement with the casing 110 thereby creating sufficient frictional force to seal the interface between the liner 120 and the casing and support the weight of the liner using the casing.

[0019] In several exemplary embodiments, the liner 120 is radially expanded and plastically deformed into engagement with the casing 110 in a conventional manner and/or using one or more of the methods and apparatus disclosed in one or more of the following: (1) U.S. patent application serial no. 09/454,139, attorney docket no. 25791.03.02, filed on 12/3/1999, (2) U.S. patent application serial no. 09/510,913, attorney docket no. 25791.7.02, filed on 2/23/2000, (3) U.S. patent application serial no. 09/502,350, attorney docket no. 25791.8.02, filed on 2/10/2000, (4) U.S. patent application serial no. 09/440,338, attorney docket no. 25791.9.02, filed on 11/15/1999, (5) U.S. patent application serial no. 09/523,460, attorney docket no. 25791.11.02, filed on 3/10/2000, (6) U.S. patent application serial no.

09/512,895, attorney docket no. 25791.12.02, filed on 2/24/2000, (7) U.S. patent application serial no. 09/511,941, attorney docket no. 25791.16.02, filed on 2/24/2000, (8) U.S. patent application serial no. 09/588,946, attorney docket no. 25791.17.02, filed on 6/7/2000, (9) U.S. patent application serial no. 09/559,122, attorney docket no. 25791.23.02, filed on 4/26/2000, (10) PCT patent application serial no. PCT/US00/18635, attorney docket no. 25791.25.02, filed on 7/9/2000, (11) U.S. provisional patent application serial no. 60/162,671, attorney docket no. 25791.27, filed on 11/1/1999, (12) U.S. provisional patent application serial no. 60/154,047, attorney docket no. 25791.29, filed on 9/16/1999, (13) U.S. provisional patent application serial no. 60/159,082, attorney docket no. 25791.34, filed on 10/12/1999, (14) U.S. provisional patent application serial no. 60/159,039, attorney docket no. 25791.36, filed on 10/12/1999, (15) U.S. provisional patent application serial no. 60/159,033, attorney docket no. 25791.37, filed on 10/12/1999, (16) U.S. provisional patent application serial no. 60/212,359, attorney docket no. 25791.38, filed on 6/19/2000, (17) U.S. provisional patent application serial no. 60/165,228, attorney docket no. 25791.39, filed on 11/12/1999, (18) U.S. provisional patent application serial no. 60/221,443, attorney docket no. 25791.45, filed on 7/28/2000, (19) U.S. provisional patent application serial no. 60/221,645, attorney docket no. 25791.46, filed on 7/28/2000, (20) U.S. provisional patent application serial no. 60/233,638, attorney docket no. 25791.47, filed on 9/18/2000, (21) U.S. provisional patent application serial no. 60/237,334, attorney docket no. 25791.48, filed on 10/2/2000, (22) U.S. provisional patent application serial no. 60/270,007, attorney docket no. 25791.50, filed on 2/20/2001; (23) U.S. provisional patent application serial no. 60/262,434, attorney docket no. 25791.51, filed on 1/17/2001; (24) U.S, provisional patent application serial no. 60/259,486, attorney docket no. 25791.52, filed on 1/3/2001; (25) U.S. provisional patent application serial no. 60/303,740, attorney docket no. 25791.61, filed on 7/6/2001; (26) U.S. provisional patent application serial no. 60/313,453, attorney docket no. 25791.59, filed on 8/20/2001; (27) U.S. provisional patent application serial no. 60/317,985, attorney docket no. 25791.67, filed on 9/6/2001; (28) U.S. provisional patent application serial no. 60/3318,386, attorney docket no. 25791.67.02, filed on 9/10/2001; (29) U.S. utility patent application serial no. 09/969,922, attorney docket no. 25791.69, filed on 10/3/2001; and (30) U.S. utility patent application serial no. 10/016,467, attorney docket no. 25791.70, filed on December 10, 2001, the disclosures of which are incorporated herein by reference.

[0020] In an exemplary embodiment, as illustrated in Figs. 2 and 2a, the upper end 120a of the liner 120 is then machined to provide a first beveled portion 120aa and a second beveled portion 120ab. In an exemplary embodiment, the angle of attack of the first beveled portion 120aa is about 45° and the angle of attack of the second beveled portion 120ab is about 15°.

[0021] As illustrated in Figs. 3 and 4, an end 135a of a tubular locator 135 that defines a passage 135b and includes a flange 135c and an external threaded connection 135d at another end 135e is then inserted into the upper end 120a of the liner 120. The flange 135c further includes a tapered end face 135ca that mates with the first portion 120aa of the machined upper end 120a of the liner 120. In this manner, the

tubular locator 135 mates with and is supported by the upper end 120a of the liner 120. Furthermore, the compound angular profile of the combination of the first and second portions, 120aa and 120ab, of the machined upper end 120a of the liner 120 facilitates the insertion of the end 135a of the tubular location 135 within the upper end of the liner.

[0022] An end 140a of a tubular seal assembly 140 that defines a passage 140b and includes external seals 140c, 140d, and 140e, is removably coupled to the external threaded connection 135d of the end 135e of the tubular locator 135 by an internal threaded connection 140f. A portion of the other end 140g of the tubular seal assembly 140 is tapered at approximately an angle of about 45 degrees in order to facilitate the insertion and removal of equipment.

[0023] As illustrated in Fig. 4a, in an exemplary embodiment, the external seal 140c includes an elastomeric seal 140ca that is retained within an external groove 140cb by a retaining element 140cc. In an exemplary embodiment, the external seals 140c fluidicly seal the interface between the tubular seal assembly 140 and the wellbore casing 110.

[0024] As illustrated in Fig. 4b, in an exemplary embodiment, the external seal 140d includes an elastomeric seal 140da that is retained within an external groove 140db by a retaining element 140dc. In an exemplary embodiment, the external seals 140d fluidicly seal the interface between the tubular seal assembly 140 and the wellbore casing 110.

[0025] As illustrated in Fig. 4c, in an exemplary embodiment, the external seal 140e includes an elastomeric seal 140ea that is retained within an external groove 140eb by a retaining element 140ec. In an exemplary embodiment, the external seals 140e fluidicly seal the interface between the tubular seal assembly 140 and the wellbore casing 110.

[0026] During operation, in an exemplary embodiment, after the liner 120 has been radially expanded and plastically deformed into engagement with the casing 110, the upper end 120a of the liner 120 is then machined to provide the first beveled portion 120aa and the second beveled portion 120ab. The tubular locator 135 and tubular seal assembly 140 are then inserted into the interior of the casing 110, and the end 135a of the tubular location is inserted into the upper end 120a of the tubular liner 120. The external seals 140c, 140d, and 140e of the tubular seal assembly then fluidicly seal the interface between the tubular seal assembly and the casing. In this manner, the tubular locator 135 and the tubular seal assembly 140 provide a pressure sealed tubular liner for conveying fluidic materials to and from the tubular liner 120. In this manner, the need for a tie-back liner may be eliminated thereby providing a cost effective alternative to conventional methods and apparatus for providing a pressure sealed tubular liner.

[0027] An apparatus has been described that includes a subterranean formation defining a wellbore, a tubular wellbore casing positioned within and coupled to the wellbore, a first tubular liner positioned within the wellbore overlapping with and coupled to the wellbore casing, and a second tubular liner positioned within the wellbore and overlapping with and coupled to the first tubular liner. The second tubular liner is coupled to the first tubular liner by machining an end of the first tubular liner, and

inserting an end of the second tubular liner into the machined end of the first tubular liner. In an exemplary embodiment, the first tubular liner is coupled to the wellbore casing by radially expanding and plastically deforming the first tubular liner into engagement with the wellbore casing.

[0028] A method for extracting fluidic materials from a subterranean formation including a wellbore that traverses the formation and a wellbore casing positioned within and coupled to the wellbore has also been described that includes coupling an end of a tubular liner to an end of the wellbore casing, machining an end of the tubular liner, inserting an end of another tubular liner into the machined end of the tubular liner, and sealing the interface between the other tubular liner and the wellbore casing. In an exemplary embodiment, the method further includes radially expanding and plastically deforming the tubular liner into engagement with the wellbore casing.

[0029] A system for extracting fluidic materials from a subterranean formation including a wellbore that traverses the formation and a wellbore casing positioned within and coupled to the wellbore has also been described that includes means for coupling an end of a tubular liner to an end of the wellbore casing, means for machining an end of the tubular liner, means for inserting an end of another tubular liner into the machined end of the tubular liner, and means for sealing the interface between the other tubular liner and the wellbore casing. In an exemplary embodiment, the system further includes means for radially expanding and plastically deforming the tubular liner into engagement with the wellbore casing.

[0030] In an apparatus comprising a subterranean formation defining a wellbore that includes a wellbore casing positioned within and coupled to the wellbore and a tubular liner coupled to an end of the wellbore casing, a method of conveying fluidic materials to and from the tubular liner has also been described that includes machining the end of the tubular liner, inserting and supporting an end of another tubular liner in the machined end of the tubular liner, and conveying fluidic materials to and from the tubular liner using the other tubular liner. In an exemplary embodiment, the other end of the tubular liner extends through the wellbore casing. In an exemplary embodiment, the method further includes fluidicly sealing the interface between the other end of the tubular liner and the wellbore casing.

[0031] The present illustrative embodiments of the invention provide a number of advantages. For example, using the machined upper end 120a of the liner 120 as a seal receptacle eliminates more costly and complicated conventional systems for providing a seal receptacle. Furthermore, the use of the tubular locator 135 and the tubular seal assembly 140 eliminates the more costly and complicated tie-back liner. As a result, the present illustrative embodiments provide a sophisticated yet less complex system for providing a pressure sealed tubular liner for conveying fluidic materials to and from the tubular liner 120.

[0032] It is understood that variations may be made in the foregoing without departing from the scope of the invention. For example, while the present system has been described in for use with a tubular liner 120 that has been radially expanded and plastically deformed into engagement with the casing 110, the teachings of the present embodiments may also be applied to tubular liners that are coupled to a

preexisting casing without radial expansion and plastic deformation. Furthermore, while illustrative embodiments of the present system have been presented for extracting oil and gas from a subterranean formation, the teachings of the present embodiments may also be applied to the extraction of geothermal energy from subterranean formations. In addition, in several exemplary embodiments, the seals 140c, 140d, and/or 140e, seal the interface between the tubular seal assembly 140 and the wellbore casing 110.

[0033] Although illustrative embodiments of the invention have been shown and described, a wide range of modification, changes and substitution is contemplated in the foregoing disclosure. In some instances, some features of the present invention may be employed without a corresponding use of the other features. Accordingly, it is appropriate that the appended claims be construed broadly and in a manner consistent with the scope of the invention.

What is claimed is:

1. An apparatus, comprising:

a subterranean formation defining a wellbore;

a tubular wellbore casing positioned within and coupled to the wellbore;

a first tubular liner positioned within the wellbore overlapping with and coupled to the wellbore casing;

a second tubular liner positioned within the wellbore and overlapping with and coupled to the first tubular liner;

wherein the second tubular liner is coupled to the first tubular liner by:

machining an end of the first tubular liner; and

inserting an end of the second tubular liner into the machined end of the first tubular liner.

2. The apparatus of claim 1, wherein the first tubular liner is coupled to the wellbore casing by radially expanding and plastically deforming the first tubular liner into engagement with the wellbore casing.

3. A method for extracting fluidic materials from a subterranean formation including a wellbore that traverses the formation and a wellbore casing positioned within and coupled to the wellbore, comprising:

coupling an end of a tubular liner to an end of the wellbore casing;

machining an end of the tubular liner;

inserting an end of another tubular liner into the machined end of the tubular liner; and

sealing the interface between the other tubular liner and the wellbore casing.

4. The method of claim 3, further comprising:

radially expanding and plastically deforming the tubular liner into engagement with the wellbore casing.

5. A system for extracting fluidic materials from a subterranean formation including a wellbore that traverses the formation and a wellbore casing positioned within and coupled to the wellbore, comprising:

means for coupling an end of a tubular liner to an end of the wellbore casing;

means for machining an end of the tubular liner;

means for inserting an end of another tubular liner into the machined end of the tubular liner; and

means for sealing the interface between the other tubular liner and the wellbore casing.

6. The system of claim 5, further comprising:

means for radially expanding and plastically deforming the tubular liner into engagement with the wellbore casing.

7. In an apparatus comprising a subterranean formation defining a wellbore that includes a wellbore casing positioned within and coupled to the wellbore and a tubular liner coupled to an end of the wellbore casing, a method of conveying fluidic materials to and from the tubular liner, comprising:

machining the end of the tubular liner;

inserting and supporting an end of another tubular liner in the machined end of the tubular liner; and

conveying fluidic materials to and from the tubular liner using the other tubular liner.

8. The method of claim 7, wherein the other end of the tubular liner extends through the wellbore casing.

9. The method of claim 8, further comprising:

fluidicly sealing the interface between the other end of the tubular liner and the wellbore casing.

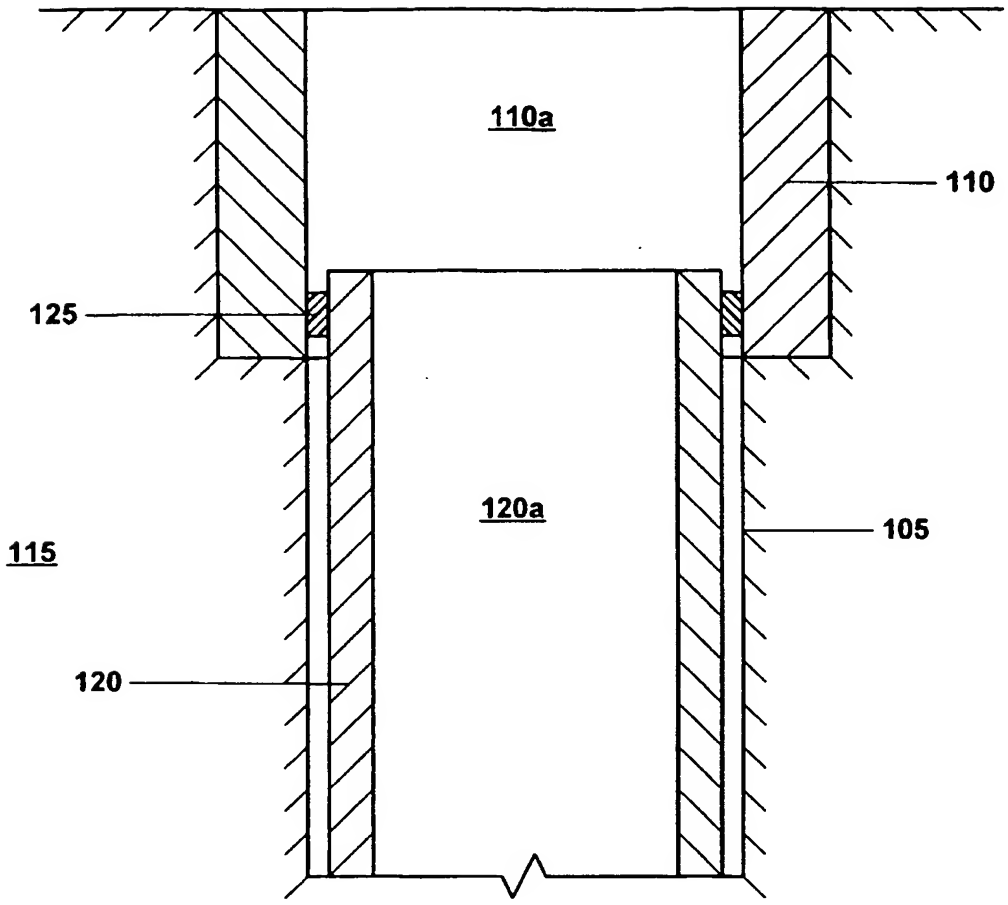

Fig. 1

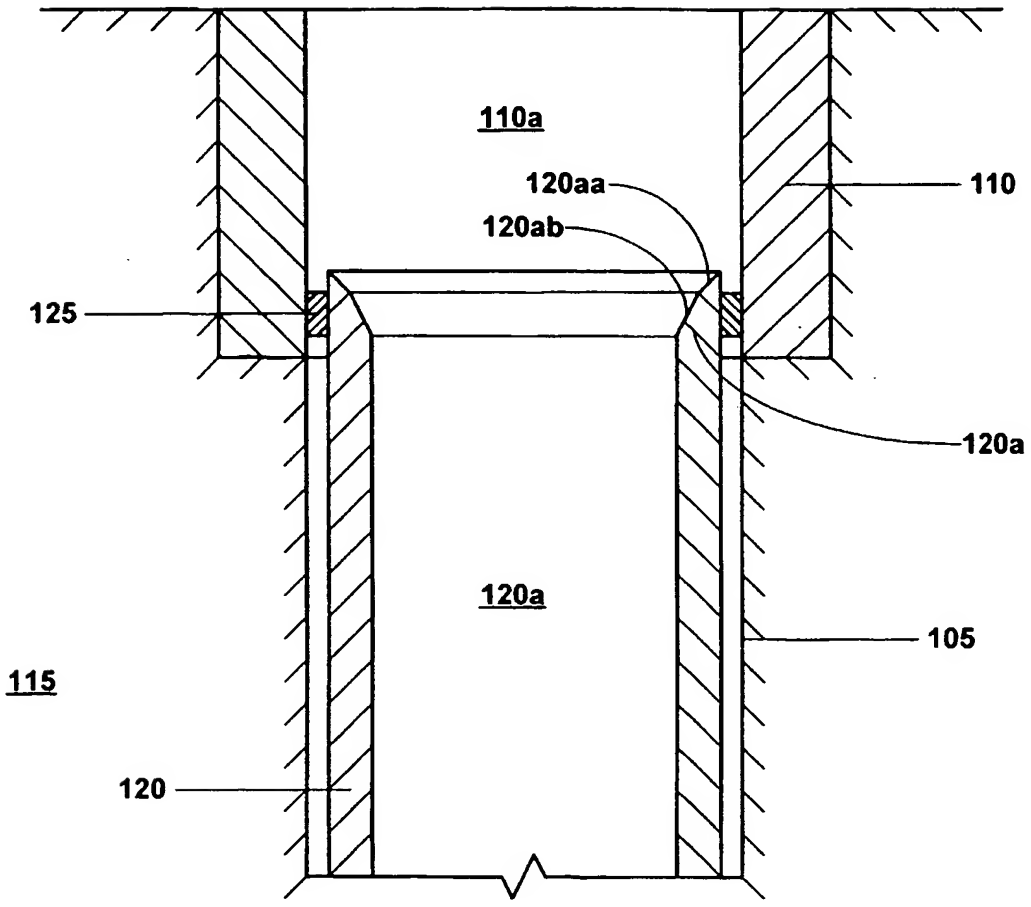

Fig. 2

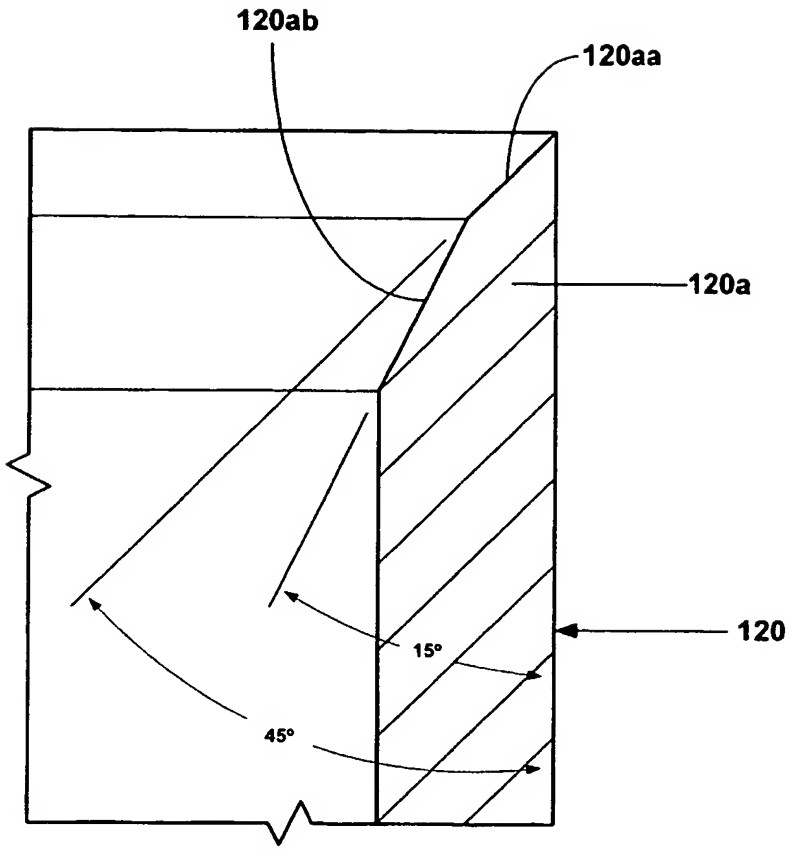

Fig. 2a

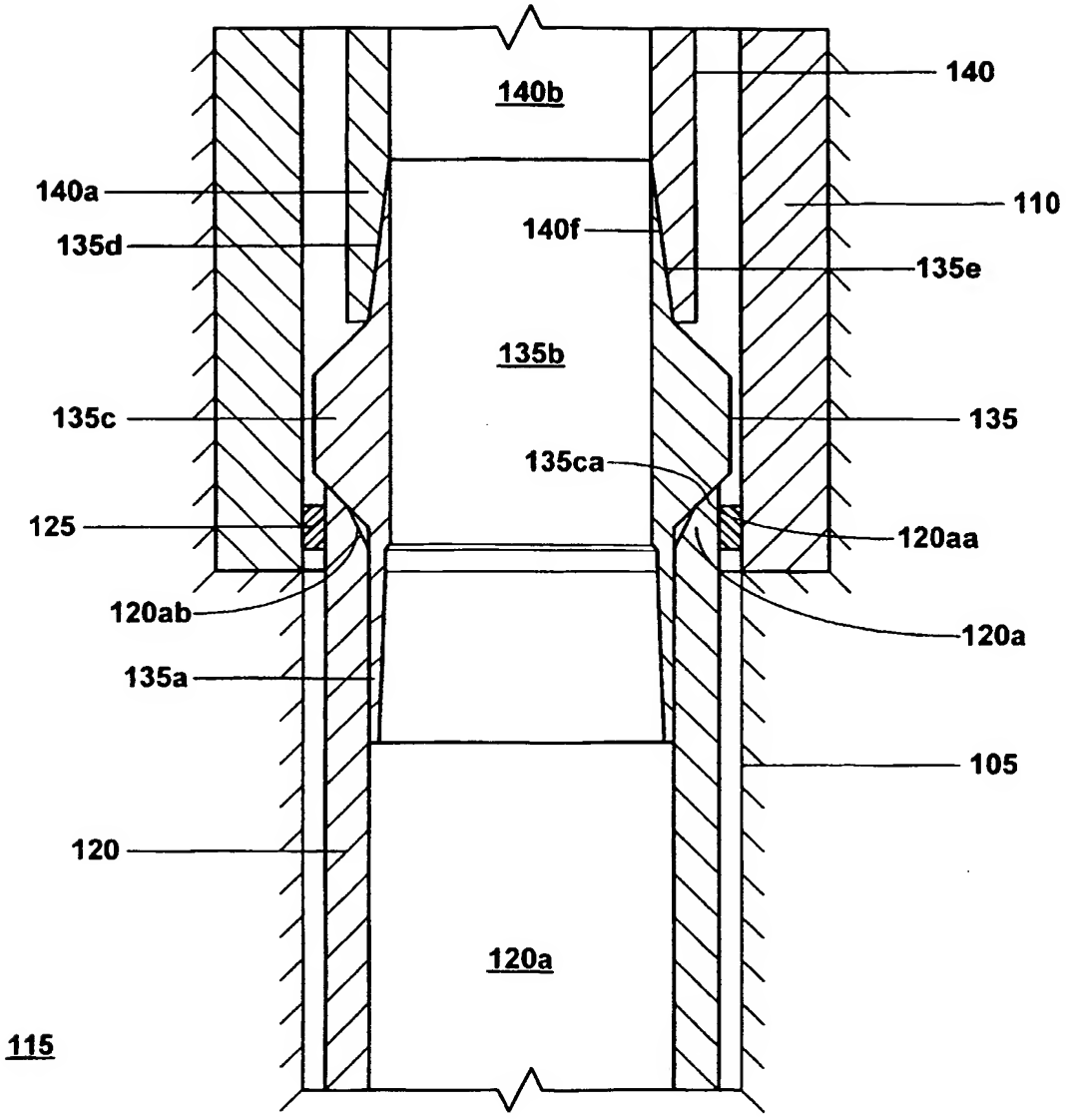
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Fig. 3

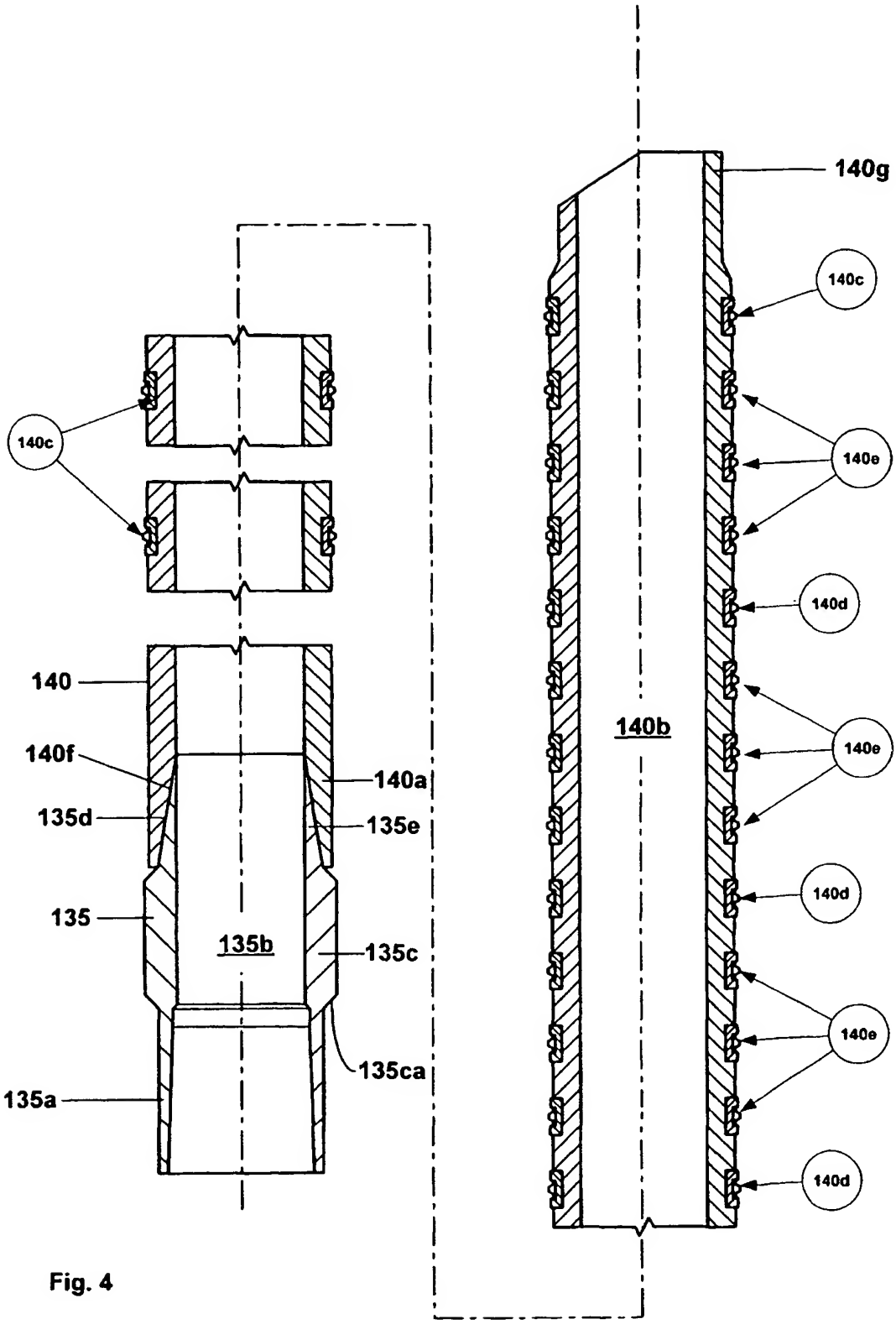
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Fig. 4

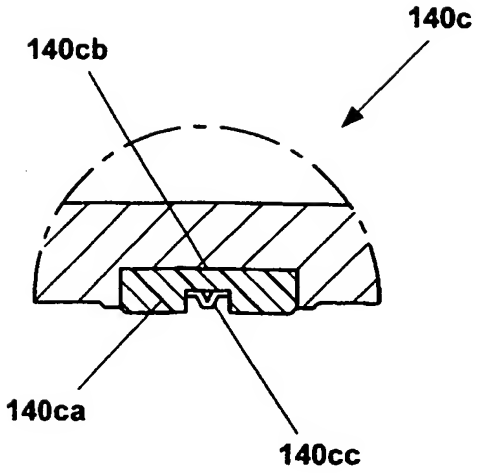

Fig. 4a

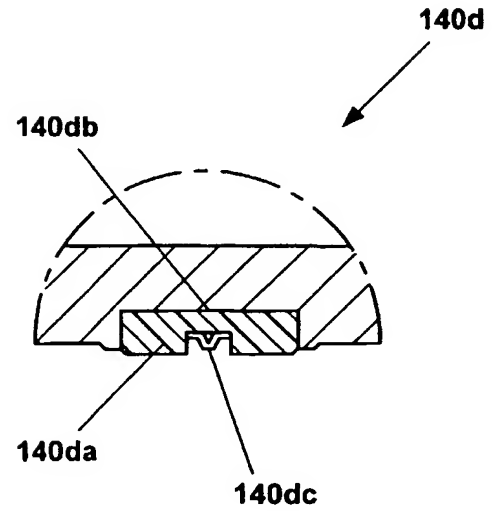

Fig. 4b

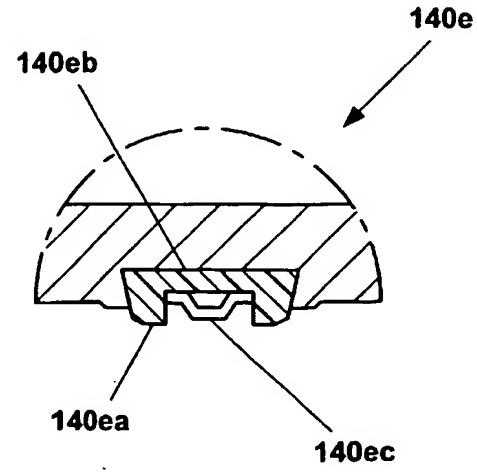

Fig. 4c

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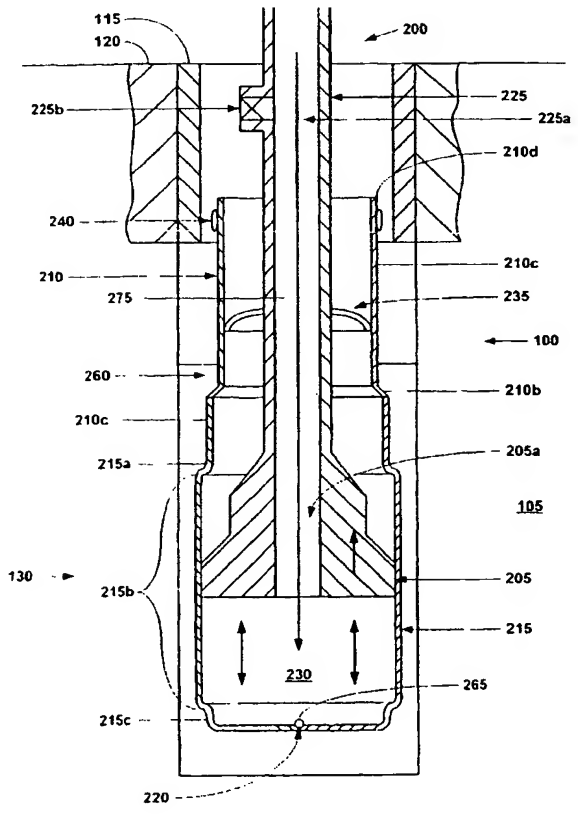
(54) Title: MONO-DIAMETER WELLBORE CASING

(57) Abstract: A mono-diameter wellbore casing.



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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2002/0033261 A1 (METCALFE) 21 March 2002 (21.03.02), summary.	1-55
A	US 6,085,838 A (VERCAEMER et al.) 11 July 2000 (11.07.02), figures 5-7.	1-55

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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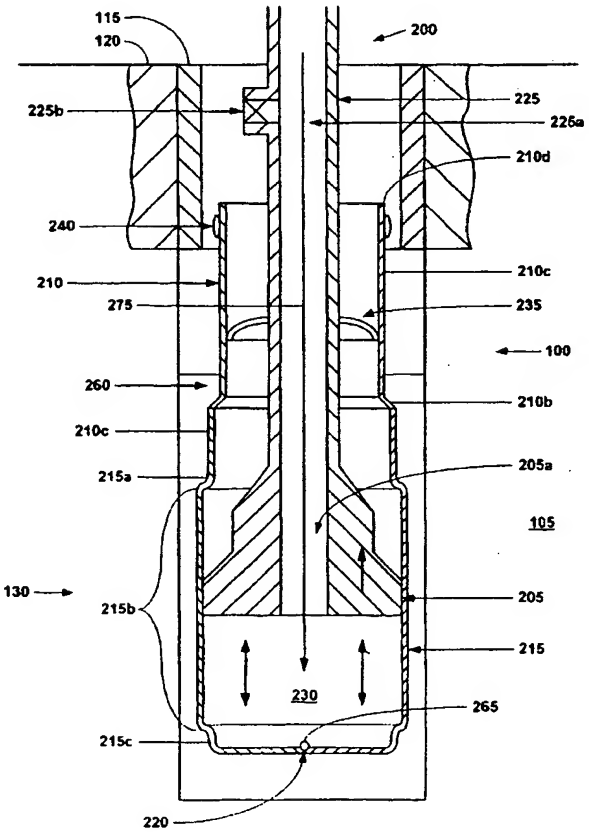

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AMENDED CLAIMS

[Received by the International Bureau on 15 July 2004 (15.07.04):
original claims 1 - 55 amended;
new claims 56 - 78 added (2 pages)]

Claims

1. An apparatus for forming a wellbore casing in a borehole located in a subterranean formation including a preexisting wellbore casing, comprising:
a support member including a first fluid passage;
an expansion cone coupled to the support member including a second fluid passage fluidicly coupled to the first fluid passage;
an expandable tubular liner movably coupled to the expansion cone; and
an expandable shoe coupled to the expandable tubular liner;
wherein the expansion cone is adjustable to a plurality of stationary positions.

2. The apparatus of claim 1, wherein the expandable shoe includes a valveable fluid passage for controlling the flow of fluidic materials out of the expandable shoe.

3. The apparatus of claim 1, wherein the expandable shoe includes:
an expandable portion; and
a remaining portion coupled to the expandable portion;
wherein the outer circumference of the expandable portion is greater than the outer circumference of the remaining portion.

4. The apparatus of claim 3, wherein the expandable portion includes:
one or more inward folds.

5. The apparatus of claim 3, wherein the expandable portion includes:
one or more corrugations.

6. The apparatus of claim 1, wherein the expandable shoe includes:
one or more inward folds.

7. The apparatus of claim 1, wherein the expandable shoe includes:
one or more corrugations.

8. A method of forming a wellbore casing in a subterranean formation having a preexisting wellbore casing positioned in a borehole, comprising:

installing a tubular liner, an adjustable expansion cone, and a shoe in the borehole;
radially expanding at least a portion of the shoe by a process comprising:
adjusting the adjustable expansion cone to a first outside diameter; and
injecting a fluidic material into the shoe; and
radially expanding at least a portion of the tubular liner by a process comprising:
adjusting the adjustable expansion cone to a second outside diameter; and
injecting a fluidic material into the borehole below the expansion cone.

9. The method of claim 8, wherein the first outside diameter of the adjustable expansion cone is greater than the second outside diameter of the adjustable expansion cone.

10. The method of claim 8, wherein radially expanding at least a portion of the shoe further comprises:
lowering the adjustable expansion cone into the shoe; and
adjusting the adjustable expansion cone to the first outside diameter.

11. The method of claim 8, wherein radially expanding at least a portion of the shoe further comprises:
pressurizing a region within the shoe below the adjustable expansion cone using a fluidic material; and
pressurizing an annular region above the adjustable expansion cone using the fluidic material.

12. The method of claim 8, wherein radially expanding at least a portion of the tubular liner further comprises:
pressurizing a region within the shoe below the adjustable expansion cone using a fluidic material; and
pressurizing an annular region above the adjustable expansion cone using the fluidic material.

13. A system for forming a wellbore casing in a subterranean formation having a preexisting wellbore casing positioned in a borehole, comprising:
means for installing a tubular liner, an adjustable expansion cone, and a shoe in the borehole;

means for radially expanding at least a portion of the shoe comprising:
means for adjusting the adjustable expansion cone to a first outside diameter; and
means for injecting a fluidic material into the shoe; and
means for radially expanding at least a portion of the tubular liner comprising:
means for adjusting the adjustable expansion cone to a second outside diameter; and
means for injecting a fluidic material into the borehole below the adjustable expansion cone.

14. The system of claim 13, wherein the first outside diameter of the adjustable expansion cone is greater than the second outside diameter of the adjustable expansion cone.

15. The system of claim 13, wherein the means for radially expanding at least a portion of the shoe further comprises:
means for lowering the adjustable expansion cone into the shoe; and
means for adjusting the adjustable expansion cone to the first outside diameter.

16. The system of claim 13, wherein the means for radially expanding at least a portion of the shoe further comprises:
means for pressurizing a region within the shoe below the adjustable expansion cone using a fluidic material; and
means for pressurizing an annular region above the adjustable expansion cone using the fluidic material.

17. The system of claim 13, wherein the means for radially expanding at least a portion of the tubular liner further comprises:
means for pressurizing a region within the shoe below the adjustable expansion cone using a fluidic material; and
means for pressurizing an annular region above the adjustable expansion cone using the fluidic material.

18. A wellbore casing positioned in a borehole within a subterranean formation, comprising:

a first wellbore casing comprising:
an upper portion of the first wellbore casing; and
a lower portion of the first wellbore casing coupled to the upper portion of the first wellbore casing;
wherein the inside diameter of the upper portion of the first wellbore casing is less than the inside diameter of the lower portion of the first wellbore casing; and
a second wellbore casing comprising:
an upper portion of the second wellbore casing that overlaps with and is coupled to the lower portion of the first wellbore casing; and
a lower portion of the second wellbore casing coupled to the upper portion of the second wellbore casing;
wherein the inside diameter of the upper portion of the second wellbore casing is less than the inside diameter of the lower portion of the second wellbore casing; and
wherein the inside diameter of the upper portion of the first wellbore casing is equal to the inside diameter of the upper portion of the second wellbore casing;
wherein the second wellbore casing is coupled to the first wellbore casing by the process of:
installing the second wellbore casing and an adjustable expansion cone within the borehole;
radially expanding at least a portion of the lower portion of the second wellbore casing by a process comprising:
adjusting the adjustable expansion cone to a first outside diameter; and
injecting a fluidic material into the second wellbore casing; and
radially expanding at least a portion of the upper portion of the second wellbore casing by a process comprising:
adjusting the adjustable expansion cone to a second outside diameter; and
injecting a fluidic material into the borehole below the adjustable expansion cone.

19. The wellbore casing of claim 18, wherein the first outside diameter of the adjustable expansion cone is greater than the second outside diameter of the adjustable expansion cone.

20. The wellbore casing of claim 18, wherein radially expanding at least a portion of the lower portion of the second wellbore casing further comprises:

lowering the adjustable expansion cone into the lower portion of the second wellbore casing; and

adjusting the adjustable expansion cone to the first outside diameter.

21. The wellbore casing of claim 18, wherein radially expanding at least a portion of the lower portion of the second wellbore casing further comprises:

pressurizing a region within the lower portion of the second wellbore casing below the adjustable expansion cone using a fluidic material; and

pressurizing an annular region above the adjustable expansion cone using the fluidic material.

22. The wellbore casing of claim 18, wherein radially expanding at least a portion of the upper portion of the second wellbore casing further comprises:

pressurizing a region within the lower portion of the second wellbore casing below the adjustable expansion cone using a fluidic material; and

pressurizing an annular region above the adjustable expansion cone using the fluidic material.

23. An apparatus for forming a wellbore casing in a borehole located in a subterranean formation including a preexisting wellbore casing, comprising:

a support member including a first fluid passage;

a first adjustable expansion cone coupled to the support member including a second fluid passage fluidicly coupled to the first fluid passage;

a second adjustable expansion cone coupled to the support member including a third fluid passage fluidicly coupled to the first fluid passage;

an expandable tubular liner movably coupled to the first and second adjustable expansion cones; and

an expandable shoe coupled to the expandable tubular liner.

24. The apparatus of claim 23, wherein the expandable shoe includes a valveable fluid passage for controlling the flow of fluidic materials out of the expandable shoe.

25. The apparatus of claim 23, wherein the expandable shoe includes:

an expandable portion; and

a remaining portion coupled to the expandable portion;

wherein the outer circumference of the expandable portion is greater than the outer circumference of the remaining portion.

26. The apparatus of claim 25, wherein the expandable portion includes:

one or more inward folds.

27. The apparatus of claim 25, wherein the expandable portion includes:

one or more corrugations.

28. The apparatus of claim 23, wherein the expandable shoe includes:

one or more inward folds.

29. The apparatus of claim 23, wherein the expandable shoe includes:

one or more corrugations.

30. A method of forming a wellbore casing in a subterranean formation having a preexisting wellbore casing positioned in a borehole, comprising:

installing a tubular liner, an upper adjustable expansion cone, a lower adjustable expansion cone, and a shoe in the borehole;

radially expanding at least a portion of the shoe by a process comprising:

adjusting the lower adjustable expansion cone to an increased outside diameter; and

injecting a fluidic material into the shoe; and

radially expanding at least a portion of the tubular liner by a process comprising:

adjusting the lower adjustable expansion cone to a reduced outside diameter;

adjusting the upper adjustable expansion cone to an increased outside diameter; and

injecting a fluidic material into the borehole below the lower adjustable expansion cone.

31. The method of claim 30, wherein the increased outside diameter of the lower adjustable expansion cone is greater than the increased outside diameter of the upper adjustable expansion cone.

32. The method of claim 30, wherein the reduced outside diameter of the lower adjustable expansion cone is less than or equal to the increased outside diameter of the upper adjustable expansion cone.

33. The method of claim 30, wherein radially expanding at least a portion of the shoe further comprises:

lowering the lower adjustable expansion cone into the shoe; and

adjusting the lower adjustable expansion cone to the increased outside diameter.

34. The method of claim 30, wherein radially expanding at least a portion of the shoe further comprises:

pressurizing a region within the shoe below the lower adjustable expansion cone using a fluidic material; and

pressurizing an annular region above the upper adjustable expansion cone using the fluidic material.

35. The method of claim 30, wherein radially expanding at least a portion of the tubular liner further comprises:

pressurizing a region within the shoe below the lower adjustable expansion cone using a fluidic material; and

pressurizing an annular region above the upper adjustable expansion cone using the fluidic material.

36. A system for forming a wellbore casing in a subterranean formation having a preexisting wellbore casing positioned in a borehole, comprising:

means for installing a tubular liner, an upper adjustable expansion cone, a lower adjustable expansion cone, and a shoe in the borehole;

means for radially expanding at least a portion of the shoe comprising:

means for adjusting the lower adjustable expansion cone to an increased outside diameter; and

means for injecting a fluidic material into the shoe; and

means for radially expanding at least a portion of the tubular liner comprising:

means for adjusting the lower adjustable expansion cone to a reduced outside diameter;

means for adjusting the upper adjustable expansion cone to an increased outside diameter; and

means for injecting a fluidic material into the borehole below the lower adjustable expansion cone.

37. The system of claim 36, wherein the increased outside diameter of the lower adjustable expansion cone is greater than the increased outside diameter of the upper adjustable expansion cone.

38. The system of claim 36, wherein the reduced outside diameter of the lower adjustable expansion cone is less than or equal to the increased outside diameter of the upper adjustable expansion cone.

39. The system of claim 36, wherein the means for radially expanding at least a portion of the shoe further comprises:

means for lowering the lower adjustable expansion cone into the shoe; and

means for adjusting the lower adjustable expansion cone to the increased outside diameter.

40. The system of claim 36, wherein the means for radially expanding at least a portion of the shoe further comprises:

means for pressurizing a region within the shoe below the lower adjustable expansion cone using a fluidic material; and

means for pressurizing an annular region above the upper adjustable expansion cone using the fluidic material.

41. The system of claim 36, wherein the means for radially expanding at least a portion of the tubular liner further comprises:

means for pressurizing a region within the shoe below the lower adjustable expansion cone using a fluidic material; and

means for pressurizing an annular region above the upper adjustable expansion cone using the fluidic material.

42. A wellbore casing positioned in a borehole within a subterranean formation, comprising:

a first wellbore casing comprising:

an upper portion of the first wellbore casing; and

a lower portion of the first wellbore casing coupled to the upper portion of the first wellbore casing;

wherein the inside diameter of the upper portion of the first wellbore casing is less than the inside diameter of the lower portion of the first wellbore casing; and

a second wellbore casing comprising:

an upper portion of the second wellbore casing that overlaps with and is coupled to the lower portion of the first wellbore casing; and

a lower portion of the second wellbore casing coupled to the upper portion of the second wellbore casing;

wherein the inside diameter of the upper portion of the second wellbore casing is less than the inside diameter of the lower portion of the second wellbore casing; and

wherein the inside diameter of the upper portion of the first wellbore casing is equal to the inside diameter of the upper portion of the second wellbore casing;

wherein the second wellbore casing is coupled to the first wellbore casing by the process of:

installing the second wellbore casing, an upper adjustable expansion cone, a lower adjustable expansion cone, and a shoe in the borehole;

radially expanding at least a portion of the lower portion of the second wellbore casing shoe by a process comprising:

adjusting the lower adjustable expansion cone to an increased outside diameter; and

injecting a fluidic material into the lower portion of the second wellbore casing; and

radially expanding at least a portion of the upper portion of the second wellbore casing by a process comprising:

adjusting the lower adjustable expansion cone to a reduced outside diameter;

adjusting the upper adjustable expansion cone to an increased outside diameter; and

injecting a fluidic material into the borehole below the lower adjustable expansion cone.

43. The wellbore casing of claim 42, wherein the increased outside diameter of the lower adjustable expansion cone is greater than the increased outside diameter of the upper adjustable expansion cone.

44. The wellbore casing of claim 42, wherein the reduced outside diameter of the lower adjustable expansion cone is less than or equal to the increased outside diameter of the upper adjustable expansion cone.

45. The wellbore casing of claim 42, wherein radially expanding at least a portion of the lower portion of the second wellbore casing further comprises:

lowering the lower adjustable expansion cone into the lower portion of the second wellbore casing; and

adjusting the lower adjustable expansion cone to the increased outside diameter.

46. The wellbore casing of claim 42, wherein radially expanding at least a portion of the lower portion of the second wellbore casing further comprises:

pressurizing a region within the lower portion of the second wellbore casing below the lower adjustable expansion cone using a fluidic material; and

pressurizing an annular region above the upper adjustable expansion cone using the fluidic material.

47. The wellbore casing of claim 42, wherein radially expanding at least a portion of the upper portion of the second wellbore casing further comprises:

pressurizing a region within the lower portion of the second wellbore casing below the lower adjustable expansion cone using a fluidic material; and

pressurizing an annular region above the upper adjustable expansion cone using the fluidic material.

48. An apparatus for forming a wellbore casing in a borehole located in a subterranean formation including a preexisting wellbore casing, comprising:

a support member including a first fluid passage;

an expansion cone coupled to the support member including a second fluid passage fluidicly coupled to the first fluid passage;

an expandable tubular liner movably coupled to the expansion cone; and

an expandable shoe coupled to the expandable tubular liner comprising:
a valveable fluid passage for controlling the flow of fluidic materials out of the expandable shoe;
an expandable portion comprising one or more inward folds; and
a remaining portion coupled to the expandable portion;
wherein the outer circumference of the expandable portion is greater than the outer circumference of the remaining portion;
wherein the expansion cone is adjustable to a plurality of stationary positions.

49. A method of forming a wellbore casing in a subterranean formation having a preexisting wellbore casing positioned in a borehole, comprising:
installing a tubular liner, an adjustable expansion cone, and a shoe in the borehole;
radially expanding at least a portion of the shoe by a process comprising:
lowering the adjustable expansion cone into the shoe;
adjusting the adjustable expansion cone to a first outside diameter;
pressurizing a region within the shoe below the adjustable expansion cone using a fluidic material; and
pressurizing an annular region above the adjustable expansion cone using the fluidic material; and
radially expanding at least a portion of the tubular liner by a process comprising:
adjusting the adjustable expansion cone to a second outside diameter;
pressurizing a region within the shoe below the adjustable expansion cone using a fluidic material; and
pressurizing an annular region above the adjustable expansion cone using the fluidic material;
wherein the first outside diameter of the adjustable expansion cone is greater than the second outside diameter of the adjustable expansion cone.

50. A system for forming a wellbore casing in a subterranean formation having a preexisting wellbore casing positioned in a borehole, comprising:
means for installing a tubular liner, an adjustable expansion cone, and a shoe in the borehole;
means for radially expanding at least a portion of the shoe comprising:
means for lowering the adjustable expansion cone into the shoe;

means for adjusting the adjustable expansion cone to a first outside diameter;

means for pressurizing a region within the shoe below the adjustable expansion cone using a fluidic material; and

means for pressurizing an annular region above the adjustable expansion cone using the fluidic material; and

means for radially expanding at least a portion of the tubular liner comprising:

means for adjusting the adjustable expansion cone to a second outside diameter;

means for pressurizing a region within the shoe below the adjustable expansion cone using a fluidic material; and

means for pressurizing an annular region above the adjustable expansion cone using the fluidic material

wherein the first outside diameter of the adjustable expansion cone is greater than the second outside diameter of the adjustable expansion cone.

51. A wellbore casing positioned in a borehole within a subterranean formation, comprising:

a first wellbore casing comprising:

an upper portion of the first wellbore casing; and

a lower portion of the first wellbore casing coupled to the upper portion of the first wellbore casing;

wherein the inside diameter of the upper portion of the first wellbore casing is less than the inside diameter of the lower portion of the first wellbore casing; and

a second wellbore casing comprising:

an upper portion of the second wellbore casing that overlaps with and is coupled to the lower portion of the first wellbore casing; and

a lower portion of the second wellbore casing coupled to the upper portion of the second wellbore casing;

wherein the inside diameter of the upper portion of the second wellbore casing is less than the inside diameter of the lower portion of the second wellbore casing; and

wherein the inside diameter of the upper portion of the first wellbore casing is equal to the inside diameter of the upper portion of the second wellbore casing;

wherein the second wellbore casing is coupled to the first wellbore casing by the process of:

installing the second wellbore casing and an adjustable expansion cone in the borehole;

radially expanding at least a portion of the lower portion of the second wellbore casing by a process comprising:

lowering the adjustable expansion cone into the lower portion of the second wellbore casing;

adjusting the adjustable expansion cone to a first outside diameter;

pressurizing a region within the lower portion of the second wellbore casing below the adjustable expansion cone using a fluidic material; and

pressurizing an annular region above the adjustable expansion cone using the fluidic material; and

radially expanding at least a portion of the upper portion of the second wellbore casing by a process comprising:

adjusting the adjustable expansion cone to a second outside diameter;

pressurizing a region within the shoe below the adjustable expansion cone using a fluidic material; and

pressurizing an annular region above the adjustable expansion cone using the fluidic material;

wherein the first outside diameter of the adjustable expansion cone is greater than the second outside diameter of the adjustable expansion cone.

52. An apparatus for forming a wellbore casing in a borehole located in a subterranean formation including a preexisting wellbore casing, comprising:

a support member including a first fluid passage;

a first adjustable expansion cone coupled to the support member including a second fluid passage fluidicly coupled to the first fluid passage;

a second adjustable expansion cone coupled to the support member including a third fluid passage fluidicly coupled to the first fluid passage;

an expandable tubular liner movably coupled to the first and second adjustable expansion cones; and

an expandable shoe coupled to the expandable tubular liner comprising:

a valveable fluid passage for controlling the flow of fluidic materials out of the expandable shoe;

an expandable portion comprising one or more inwards folds; and

a remaining portion coupled to the expandable portion;

wherein the outer circumference of the expandable portion is greater than the outer circumference of the remaining portion.

53. A method of forming a wellbore casing in a subterranean formation having a preexisting wellbore casing positioned in a borehole, comprising:

installing a tubular liner, an upper adjustable expansion cone, a lower adjustable expansion cone, and a shoe in the borehole;

radially expanding at least a portion of the shoe by a process comprising:

lowering the lower adjustable expansion cone into the shoe;

adjusting the lower adjustable expansion cone to an increased outside diameter;

pressurizing a region within the shoe below the lower adjustable expansion cone using a fluidic material; and

pressurizing an annular region above the upper adjustable expansion cone using the fluidic material; and

radially expanding at least a portion of the tubular liner by a process comprising:

adjusting the lower adjustable expansion cone to a reduced outside diameter;

adjusting the upper adjustable expansion cone to an increased outside diameter;

pressurizing a region within the shoe below the lower adjustable expansion cone using a fluidic material; and

pressurizing an annular region above the upper adjustable expansion cone using the fluidic material;

wherein the increased outside diameter of the lower adjustable expansion cone is greater than the increased outside diameter of the upper adjustable expansion cone; and

wherein the reduced outside diameter of the lower adjustable expansion cone is less than or equal to the increased outside diameter of the upper adjustable expansion cone.

54. A system for forming a wellbore casing in a subterranean formation having a preexisting wellbore casing positioned in a borehole, comprising:

means for installing a tubular liner, an upper adjustable expansion cone, a lower adjustable expansion cone, and a shoe in the borehole;

means for radially expanding at least a portion of the shoe comprising:

means for lowering the lower adjustable expansion cone into the shoe;
means for adjusting the lower adjustable expansion cone to an increased outside diameter;
means for pressurizing a region within the shoe below the lower adjustable expansion cone using a fluidic material; and
means for pressurizing an annular region above the upper adjustable expansion cone using the fluidic material; and
means for radially expanding at least a portion of the tubular liner comprising:
means for adjusting the lower adjustable expansion cone to a reduced outside diameter;
means for adjusting the upper adjustable expansion cone to an increased outside diameter;
means for pressurizing a region within the shoe below the lower adjustable expansion cone using a fluidic material; and
means for pressurizing an annular region above the upper adjustable expansion cone using the fluidic material;
wherein the increased outside diameter of the lower adjustable expansion cone is greater than the increased outside diameter of the upper adjustable expansion cone; and
wherein the reduced outside diameter of the lower adjustable expansion cone is less than or equal to the increased outside diameter of the upper adjustable expansion cone.

55. A wellbore casing positioned in a borehole within a subterranean formation, comprising:
a first wellbore casing comprising:
an upper portion of the first wellbore casing; and
a lower portion of the first wellbore casing coupled to the upper portion of the first wellbore casing;
wherein the inside diameter of the upper portion of the first wellbore casing is less than the inside diameter of the lower portion of the first wellbore casing; and
a second wellbore casing comprising:
an upper portion of the second wellbore casing that overlaps with and is coupled to the lower portion of the first wellbore casing; and

a lower portion of the second wellbore casing coupled to the upper portion of the second wellbore casing;

wherein the inside diameter of the upper portion of the second wellbore casing is less than the inside diameter of the lower portion of the second wellbore casing; and

wherein the inside diameter of the upper portion of the first wellbore casing is equal to the inside diameter of the upper portion of the second wellbore casing;

wherein the second wellbore casing is coupled to the first wellbore casing by the process of:

installing the second wellbore casing, an upper adjustable expansion cone, and a lower adjustable expansion cone in the borehole;

radially expanding at least a portion of the shoe by a process comprising:

lowering the lower adjustable expansion cone into the lower portion of the second wellbore casing;

adjusting the lower adjustable expansion cone to an increased outside diameter;

pressurizing a region within the lower portion of the second wellbore casing below the lower adjustable expansion cone using a fluidic material; and

pressurizing an annular region above the upper adjustable expansion cone using the fluidic material; and

radially expanding at least a portion of the upper portion of the second wellbore casing by a process comprising:

adjusting the lower adjustable expansion cone to a reduced outside diameter;

adjusting the upper adjustable expansion cone to an increased outside diameter;

pressurizing a region within the lower portion of the second wellbore casing below the lower adjustable expansion cone using a fluidic material; and

pressurizing an annular region above the upper adjustable expansion cone using the fluidic material;

wherein the increased outside diameter of the lower adjustable expansion cone is greater than the increased outside diameter of the upper adjustable expansion cone; and

wherein the reduced outside diameter of the lower adjustable expansion cone is less than or equal to the increased outside diameter of the upper adjustable expansion cone.

56. An apparatus for forming a wellbore casing in a borehole located in a subterranean formation including a preexisting wellbore casing, comprising:

a support member defining a first fluid passage;

an expansion device coupled to the support member defining a second fluid passage fluidicly coupled to the first fluid passage;

an expandable tubular liner movably coupled to the expansion device; and

an expandable shoe coupled to the expandable tubular liner;

wherein the expansion device is adjustable to a plurality of stationary positions.

57. A method of forming a wellbore casing in a subterranean formation having a preexisting wellbore casing positioned in a borehole, comprising:

installing a tubular liner, an adjustable expansion device, and a shoe in the borehole;

radially expanding at least a portion of the shoe by a process comprising:

adjusting the adjustable expansion device to a first outside diameter; and

injecting a fluidic material into the shoe; and

radially expanding at least a portion of the tubular liner by a process comprising:

adjusting the adjustable expansion device to a second outside diameter; and

injecting a fluidic material into the borehole below the adjustable expansion device.

58. A system for forming a wellbore casing in a subterranean formation having a preexisting wellbore casing positioned in a borehole, comprising:

means for installing a tubular liner, an adjustable expansion device, and a shoe in the borehole;

means for radially expanding at least a portion of the shoe comprising:

means for adjusting the adjustable expansion device to a first outside diameter; and

means for injecting a fluidic material into the shoe; and

means for radially expanding at least a portion of the tubular liner comprising:

means for adjusting the adjustable expansion device to a second outside diameter; and

means for injecting a fluidic material into the borehole below the adjustable expansion device.

59. A wellbore casing positioned in a borehole within a subterranean formation, comprising:

a first wellbore casing comprising:

an upper portion of the first wellbore casing; and

a lower portion of the first wellbore casing coupled to the upper portion of the first wellbore casing;

wherein the inside diameter of the upper portion of the first wellbore casing is less than the inside diameter of the lower portion of the first wellbore casing; and

a second wellbore casing comprising:

an upper portion of the second wellbore casing that overlaps with and is coupled to the lower portion of the first wellbore casing; and

a lower portion of the second wellbore casing coupled to the upper portion of the second wellbore casing;

wherein the inside diameter of the upper portion of the second wellbore casing is less than the inside diameter of the lower portion of the second wellbore casing; and

wherein the inside diameter of the upper portion of the first wellbore casing is equal to the inside diameter of the upper portion of the second wellbore casing;

wherein the second wellbore casing is coupled to the first wellbore casing by the process of:

installing the second wellbore casing and an adjustable expansion device within the borehole;

radially expanding at least a portion of the lower portion of the second wellbore casing by a process comprising:

adjusting the adjustable expansion device to a first outside diameter; and

injecting a fluidic material into the second wellbore casing; and

radially expanding at least a portion of the upper portion of the second wellbore casing by a process comprising:

adjusting the adjustable expansion device to a second outside diameter; and

injecting a fluidic material into the borehole below the adjustable expansion device.

60. An apparatus for forming a wellbore casing in a borehole located in a subterranean formation including a preexisting wellbore casing, comprising:

a support member including a first fluid passage;

a first adjustable expansion device coupled to the support member including a second fluid passage fluidicly coupled to the first fluid passage;

a second adjustable expansion device coupled to the support member including a third fluid passage fluidicly coupled to the first fluid passage;

an expandable tubular liner movably coupled to the first and second adjustable expansion devices; and

an expandable shoe coupled to the expandable tubular liner.

61. A method of forming a wellbore casing in a subterranean formation having a preexisting wellbore casing positioned in a borehole, comprising:

installing a tubular liner, an upper adjustable expansion device, a lower adjustable expansion device, and a shoe in the borehole;

radially expanding at least a portion of the shoe by a process comprising:

adjusting the lower adjustable expansion device to an increased outside diameter; and

injecting a fluidic material into the shoe; and

radially expanding at least a portion of the tubular liner by a process comprising:

adjusting the lower adjustable expansion device to a reduced outside diameter;

adjusting the upper adjustable expansion device to an increased outside diameter; and

injecting a fluidic material into the borehole below the lower adjustable expansion device.

62. A system for forming a wellbore casing in a subterranean formation having a preexisting wellbore casing positioned in a borehole, comprising:

means for installing a tubular liner, an upper adjustable expansion device, a lower adjustable expansion device, and a shoe in the borehole;

means for radially expanding at least a portion of the shoe comprising:

means for adjusting the lower adjustable expansion device to an increased outside diameter; and

means for injecting a fluidic material into the shoe; and

means for radially expanding at least a portion of the tubular liner comprising:

means for adjusting the lower adjustable expansion device to a reduced outside diameter;

means for adjusting the upper adjustable expansion device to an increased outside diameter; and

means for injecting a fluidic material into the borehole below the lower adjustable expansion device.

63. A wellbore casing positioned in a borehole within a subterranean formation, comprising:

a first wellbore casing comprising:

an upper portion of the first wellbore casing; and

a lower portion of the first wellbore casing coupled to the upper portion of the first wellbore casing;

wherein the inside diameter of the upper portion of the first wellbore casing is less than the inside diameter of the lower portion of the first wellbore casing; and

a second wellbore casing comprising:

an upper portion of the second wellbore casing that overlaps with and is coupled to the lower portion of the first wellbore casing; and

a lower portion of the second wellbore casing coupled to the upper portion of the second wellbore casing;

wherein the inside diameter of the upper portion of the second wellbore casing is less than the inside diameter of the lower portion of the second wellbore casing; and

wherein the inside diameter of the upper portion of the first wellbore casing is equal to the inside diameter of the upper portion of the second wellbore casing;

wherein the second wellbore casing is coupled to the first wellbore casing by the process of:

installing the second wellbore casing, an upper adjustable expansion device, a lower adjustable expansion device, and a shoe in the borehole;

radially expanding at least a portion of the lower portion of the second wellbore casing shoe by a process comprising:

adjusting the lower adjustable expansion device to an increased outside diameter; and

injecting a fluidic material into the lower portion of the second wellbore casing; and

radially expanding at least a portion of the upper portion of the second wellbore casing by a process comprising:

adjusting the lower adjustable expansion device to a reduced outside diameter;

adjusting the upper adjustable expansion device to an increased outside diameter; and

injecting a fluidic material into the borehole below the lower adjustable expansion device.

64. An apparatus for forming a wellbore casing in a borehole located in a subterranean formation including a preexisting wellbore casing, comprising:

a support member including a first fluid passage;

an expansion device coupled to the support member including a second fluid passage fluidicly coupled to the first fluid passage;

an expandable tubular liner movably coupled to the expansion device; and

an expandable shoe coupled to the expandable tubular liner comprising:

a valveable fluid passage for controlling the flow of fluidic materials out of the expandable shoe;

an expandable portion comprising one or more inward folds; and

a remaining portion coupled to the expandable portion;

wherein the outer circumference of the expandable portion is greater than the outer circumference of the remaining portion;

wherein the expansion device is adjustable to a plurality of stationary positions.

65. A method of forming a wellbore casing in a subterranean formation having a preexisting wellbore casing positioned in a borehole, comprising:

installing a tubular liner, an adjustable expansion device, and a shoe in the borehole;

radially expanding at least a portion of the shoe by a process comprising:

lowering the adjustable expansion device into the shoe;

adjusting the adjustable expansion device to a first outside diameter;

pressurizing a region within the shoe below the adjustable expansion device using a fluidic material; and

pressurizing an annular region above the adjustable expansion device using the fluidic material; and

radially expanding at least a portion of the tubular liner by a process comprising:

adjusting the adjustable expansion device to a second outside diameter;

pressurizing a region within the shoe below the adjustable expansion device using a fluidic material; and

pressurizing an annular region above the adjustable expansion device using the fluidic material;

wherein the first outside diameter of the adjustable expansion device is greater than the second outside diameter of the adjustable expansion device.

66. A system for forming a wellbore casing in a subterranean formation having a preexisting wellbore casing positioned in a borehole, comprising:

means for installing a tubular liner, an adjustable expansion device, and a shoe in the borehole;

means for radially expanding at least a portion of the shoe comprising:

means for lowering the adjustable expansion device into the shoe;

means for adjusting the adjustable expansion device to a first outside diameter;

means for pressurizing a region within the shoe below the adjustable expansion device using a fluidic material; and

means for pressurizing an annular region above the adjustable expansion device using the fluidic material; and

means for radially expanding at least a portion of the tubular liner comprising:

means for adjusting the adjustable expansion device to a second outside diameter;

means for pressurizing a region within the shoe below the adjustable expansion device using a fluidic material; and

means for pressurizing an annular region above the adjustable expansion device using the fluidic material;

wherein the first outside diameter of the adjustable expansion device is greater than the second outside diameter of the adjustable expansion device.

67. A wellbore casing positioned in a borehole within a subterranean formation, comprising:

a first wellbore casing comprising:

an upper portion of the first wellbore casing; and

a lower portion of the first wellbore casing coupled to the upper portion of the first wellbore casing;

wherein the inside diameter of the upper portion of the first wellbore casing is less than the inside diameter of the lower portion of the first wellbore casing; and

a second wellbore casing comprising:

an upper portion of the second wellbore casing that overlaps with and is coupled to the lower portion of the first wellbore casing; and

a lower portion of the second wellbore casing coupled to the upper portion of the second wellbore casing;

wherein the inside diameter of the upper portion of the second wellbore casing is less than the inside diameter of the lower portion of the second wellbore casing; and

wherein the inside diameter of the upper portion of the first wellbore casing is equal to the inside diameter of the upper portion of the second wellbore casing;

wherein the second wellbore casing is coupled to the first wellbore casing by the process of:

installing the second wellbore casing and an adjustable expansion device in the borehole;

radially expanding at least a portion of the lower portion of the second wellbore casing by a process comprising:

lowering the adjustable expansion device into the lower portion of the second wellbore casing;

adjusting the adjustable expansion device to a first outside diameter;

pressurizing a region within the lower portion of the second wellbore casing below the adjustable expansion device using a fluidic material; and

pressurizing an annular region above the adjustable expansion device using the fluidic material; and

radially expanding at least a portion of the upper portion of the second wellbore casing by a process comprising:

adjusting the adjustable expansion device to a second outside diameter;

pressurizing a region within the shoe below the adjustable expansion device using a fluidic material; and

pressurizing an annular region above the adjustable expansion device using the fluidic material;

wherein the first outside diameter of the adjustable expansion device is greater than the second outside diameter of the adjustable expansion device.

68. An apparatus for forming a wellbore casing in a borehole located in a subterranean formation including a preexisting wellbore casing, comprising:

a support member including a first fluid passage;

a first adjustable expansion device coupled to the support member including a second fluid passage fluidicly coupled to the first fluid passage;

a second adjustable expansion device coupled to the support member including a third fluid passage fluidicly coupled to the first fluid passage;

an expandable tubular liner movably coupled to the first and second adjustable expansion devices; and

an expandable shoe coupled to the expandable tubular liner comprising:

a valveable fluid passage for controlling the flow of fluidic materials out of the expandable shoe;

an expandable portion comprising one or more inwards folds; and

a remaining portion coupled to the expandable portion;

wherein the outer circumference of the expandable portion is greater than the outer circumference of the remaining portion.

69. A method of forming a wellbore casing in a subterranean formation having a preexisting wellbore casing positioned in a borehole, comprising:

installing a tubular liner, an upper adjustable expansion device, a lower adjustable expansion device, and a shoe in the borehole;

radially expanding at least a portion of the shoe by a process comprising:

lowering the lower adjustable expansion device into the shoe;

adjusting the lower adjustable expansion device to an increased outside diameter;

pressurizing a region within the shoe below the lower adjustable expansion device using a fluidic material; and

pressurizing an annular region above the upper adjustable expansion device using the fluidic material; and

radially expanding at least a portion of the tubular liner by a process comprising:

adjusting the lower adjustable expansion device to a reduced outside diameter;

adjusting the upper adjustable expansion device to an increased outside diameter;

pressurizing a region within the shoe below the lower adjustable expansion device using a fluidic material; and

pressurizing an annular region above the upper adjustable expansion device using the fluidic material;

wherein the increased outside diameter of the lower adjustable expansion device is greater than the increased outside diameter of the upper adjustable expansion device; and

wherein the reduced outside diameter of the lower adjustable expansion device is less than or equal to the increased outside diameter of the upper adjustable expansion device.

70. A system for forming a wellbore casing in a subterranean formation having a preexisting wellbore casing positioned in a borehole, comprising:

means for installing a tubular liner, an upper adjustable expansion device, a lower adjustable expansion device, and a shoe in the borehole;

means for radially expanding at least a portion of the shoe comprising:

means for lowering the lower adjustable expansion device into the shoe;

means for adjusting the lower adjustable expansion device to an increased outside diameter;

means for pressurizing a region within the shoe below the lower adjustable expansion device using a fluidic material; and

means for pressurizing an annular region above the upper adjustable expansion device using the fluidic material; and

means for radially expanding at least a portion of the tubular liner comprising:

means for adjusting the lower adjustable expansion device to a reduced outside diameter;

means for adjusting the upper adjustable expansion device to an increased outside diameter;

means for pressurizing a region within the shoe below the lower adjustable expansion device using a fluidic material; and

means for pressurizing an annular region above the upper adjustable expansion device using the fluidic material;

wherein the increased outside diameter of the lower adjustable expansion device is greater than the increased outside diameter of the upper adjustable expansion device; and

wherein the reduced outside diameter of the lower adjustable expansion device is less than or equal to the increased outside diameter of the upper adjustable expansion device.

71. A wellbore casing positioned in a borehole within a subterranean formation, comprising:

a first wellbore casing comprising:

an upper portion of the first wellbore casing; and

a lower portion of the first wellbore casing coupled to the upper portion of the first wellbore casing;

wherein the inside diameter of the upper portion of the first wellbore casing is less than the inside diameter of the lower portion of the first wellbore casing; and

a second wellbore casing comprising:

an upper portion of the second wellbore casing that overlaps with and is coupled to the lower portion of the first wellbore casing; and

a lower portion of the second wellbore casing coupled to the upper portion of the second wellbore casing;

wherein the inside diameter of the upper portion of the second wellbore casing is less than the inside diameter of the lower portion of the second wellbore casing; and

wherein the inside diameter of the upper portion of the first wellbore casing is equal to the inside diameter of the upper portion of the second wellbore casing;

wherein the second wellbore casing is coupled to the first wellbore casing by the process of:

installing the second wellbore casing, an upper adjustable expansion device, and a lower adjustable expansion device in the borehole;

radially expanding at least a portion of the shoe by a process comprising:

lowering the lower adjustable expansion device into the lower portion of the second wellbore casing;

adjusting the lower adjustable expansion device to an increased outside diameter;

pressurizing a region within the lower portion of the second wellbore casing below the lower adjustable expansion device using a fluidic material; and

pressurizing an annular region above the upper adjustable expansion device using the fluidic material; and

radially expanding at least a portion of the upper portion of the second wellbore casing by a process comprising:

adjusting the lower adjustable expansion device to a reduced outside diameter;

adjusting the upper adjustable expansion device to an increased outside diameter;

pressurizing a region within the lower portion of the second wellbore casing below the lower adjustable expansion device using a fluidic material; and

pressurizing an annular region above the upper adjustable expansion device using the fluidic material;

wherein the increased outside diameter of the lower adjustable expansion device is greater than the increased outside diameter of the upper adjustable expansion device; and

wherein the reduced outside diameter of the lower adjustable expansion device is less than or equal to the increased outside diameter of the upper adjustable expansion device.

72. An apparatus for radially expanding and plastically deforming a tubular member, comprising:

means for injecting fluidic materials into the tubular member to radially expand and plastically deform the tubular member; and

means for radially expanding and plastically deforming the tubular member by displacing an expansion device within the tubular member.

73. A method of forming a wellbore casing in a subterranean formation having a preexisting wellbore casing positioned in a borehole, comprising:

installing a tubular liner, an adjustable expansion device, and a shoe in the borehole;

radially expanding at least a portion of the shoe by a process comprising:

adjusting the adjustable expansion device to a first outside diameter; and

injecting a fluidic material into the shoe; and

radially expanding at least a portion of the tubular liner by a process comprising:

adjusting the adjustable expansion device to a second outside diameter; and

displacing the adjustable expansion device relative to the tubular liner.

74. A system for forming a wellbore casing in a subterranean formation having a preexisting wellbore casing positioned in a borehole, comprising:

means for installing a tubular liner, an adjustable expansion device, and a shoe in the borehole;

means for radially expanding at least a portion of the shoe comprising:

means for adjusting the adjustable expansion device to a first outside diameter; and

means for injecting a fluidic material into the shoe; and

means for radially expanding at least a portion of the tubular liner comprising:

means for adjusting the adjustable expansion device to a second outside diameter; and

means for displacing the adjustable expansion device relative to the tubular liner.

75. A wellbore casing positioned in a borehole within a subterranean formation, comprising:

a first wellbore casing comprising:

an upper portion of the first wellbore casing; and

a lower portion of the first wellbore casing coupled to the upper portion of the first wellbore casing;

wherein the inside diameter of the upper portion of the first wellbore casing is less than the inside diameter of the lower portion of the first wellbore casing; and

a second wellbore casing comprising:

an upper portion of the second wellbore casing that overlaps with and is coupled to the lower portion of the first wellbore casing; and

a lower portion of the second wellbore casing coupled to the upper portion of the second wellbore casing;

wherein the inside diameter of the upper portion of the second wellbore casing is less than the inside diameter of the lower portion of the second wellbore casing; and

wherein the inside diameter of the upper portion of the first wellbore casing is equal to the inside diameter of the upper portion of the second wellbore casing;

wherein the second wellbore casing is coupled to the first wellbore casing by the process of:

installing the second wellbore casing and an adjustable expansion device within the borehole;

radially expanding at least a portion of the lower portion of the second wellbore casing by a process comprising:

adjusting the adjustable expansion device to a first outside diameter; and

injecting a fluidic material into the second wellbore casing; and

radially expanding at least a portion of the upper portion of the second wellbore casing by a process comprising:

adjusting the adjustable expansion device to a second outside diameter; and

displacing the adjustable expansion device relative to the tubular liner.

76. A method of forming a wellbore casing in a subterranean formation having a preexisting wellbore casing positioned in a borehole, comprising:

installing a tubular liner, an upper adjustable expansion device, a lower adjustable expansion device, and a shoe in the borehole;

radially expanding at least a portion of the shoe by a process comprising:

adjusting the lower adjustable expansion device to an increased outside diameter; and

injecting a fluidic material into the shoe; and

radially expanding at least a portion of the tubular liner by a process comprising:

adjusting the lower adjustable expansion device to a reduced outside diameter;

adjusting the upper adjustable expansion device to an increased outside diameter; and

displacing the upper adjustable expansion device relative to the tubular liner.

77. A system for forming a wellbore casing in a subterranean formation having a preexisting wellbore casing positioned in a borehole, comprising:

means for installing a tubular liner, an upper adjustable expansion device, a lower adjustable expansion device, and a shoe in the borehole;

means for radially expanding at least a portion of the shoe comprising:

means for adjusting the lower adjustable expansion device to an increased outside diameter; and

means for injecting a fluidic material into the shoe; and

means for radially expanding at least a portion of the tubular liner comprising:

means for adjusting the lower adjustable expansion device to a reduced outside diameter;

means for adjusting the upper adjustable expansion device to an increased outside diameter; and

means for displacing the upper adjustable expansion device relative to the tubular liner.

78. A wellbore casing positioned in a borehole within a subterranean formation, comprising:

a first wellbore casing comprising:

an upper portion of the first wellbore casing; and

a lower portion of the first wellbore casing coupled to the upper portion of the first wellbore casing;

wherein the inside diameter of the upper portion of the first wellbore casing is less than the inside diameter of the lower portion of the first wellbore casing; and

a second wellbore casing comprising:

an upper portion of the second wellbore casing that overlaps with and is coupled to the lower portion of the first wellbore casing; and

a lower portion of the second wellbore casing coupled to the upper portion of the second wellbore casing;

wherein the inside diameter of the upper portion of the second wellbore casing is less than the inside diameter of the lower portion of the second wellbore casing; and

wherein the inside diameter of the upper portion of the first wellbore casing is equal to the inside diameter of the upper portion of the second wellbore casing;

wherein the second wellbore casing is coupled to the first wellbore casing by the process of:

installing the second wellbore casing, an upper adjustable expansion device, a lower adjustable expansion device, and a shoe in the borehole;

radially expanding at least a portion of the lower portion of the second wellbore casing shoe by a process comprising:

adjusting the lower adjustable expansion device to an increased outside diameter; and

injecting a fluidic material into the lower portion of the second wellbore casing; and

radially expanding at least a portion of the upper portion of the second wellbore casing by a process comprising:

adjusting the lower adjustable expansion device to a reduced outside diameter;

adjusting the upper adjustable expansion device to an increased outside diameter; and

displacing the upper adjustable expansion device relative to the tubular liner.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US03/00609

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : E21B 43/10
US CL : 166/380, 207
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 166/380, 207, 212, 216, 217

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2002/0033261 A1 (METCALFE) 21 March 2002 (21.03.02), summary.	1-55
A	US 6,085,838 A (VERCAEMER et al.) 11 July 2000 (11.07.02), figures 5-7.	1-55

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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15 April 2003 (15.04.2003)

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20 MAY 2003

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Form PCT/ISA/210 (second sheet) (July 1998)